MIG Welding Tips

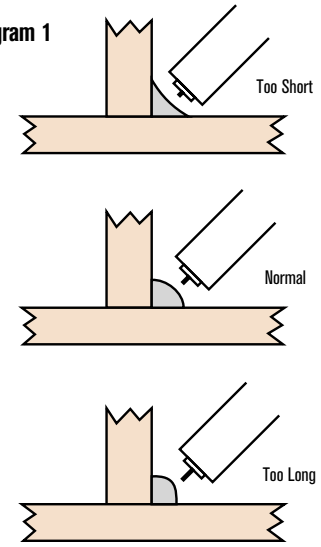
1. Keep a 1/4 to 3/8 in stickout (electrode extending from the tip of the contact tube.) **(Refer to Diagram 1. Electrode Extensions)**

2. For thin metals, use a smaller diameter wire. For thicker metal use a larger wire and a larger machine. See machine recommendations for welding capacity. **(Refer to Diagram 4. Welding Wire Thickness Chart)**

3. Use the correct wire type for the base metal being welded. Use stainless steel wires for stainless steel, aluminum wires for aluminum, and steel wires for steel.

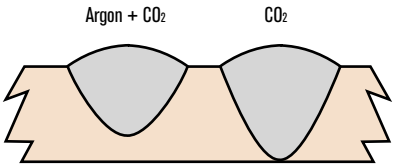
4. Use the proper shielding gas. CO2 is good for penetrating welds on steel, but may be too hot for thin metal. Use 75% Argon/25% CO2 for thinner steels. Use only Argon for aluminum. You can use a triple-mix for stainless steels (Helium + Argon + CO2). **(Refer to Diagram 2. Penetration Patterns for Steel)**

Diagram 1



Electrode Extensions (Stickout)

Diagram 2



Penetration Patterns for Steel

Diagram 4: Welding Wire Thickness Chart

MATERIAL THICKNESS	RECOMMENDED WIRE SIZES						
	MIG SOLID WIRE				GASLESS FLUX-CORED WIRE		
	.024"	.030"	.035"	.045"	.030"	.035"	.045"
24 Gauge (.025)	■						
22 Gauge (.031)	■	■			■		
20 Gauge (.037)	■	■			■	■	
18 Gauge (.050)	■	■	■		■	■	
16 Gauge (.063)		■	■		■	■	■
14 Gauge (.078)		■	■	■	■	■	■
1/8" (.125)		■	■	■		■	■
3/16" (.188)			■	■		■	■
1/4" (.25)			■	■			■
5/16" (.313)			■	■			■
3/8" (.375)			■	■			■
1/2" (.5)			■	■			■

Multi-pass welding or a beveled joint design may be required on material thickness 3/16" and greater depending on your welding machine's amperage capability.

5. For steel, there are two common wire types. Use an AWS classification ER70S-3 for all purpose, economical welding. Use ER70S-6 wire when more deoxidizers are needed for welding on dirty or rusty steel. **(Refer to Diagram 6. Welding Wire)**

6. For best control of your weld bead, keep the wire directed at the leading edge of the weld pool.

7. When welding out of position (vertical, horizontal, or overhead welding), keep the weld pool small for best weld bead control, and use the smallest wire diameter size you can.

8. Be sure to match your contact tube, gun liner, and drive rolls to the wire size you are using.

9. Clean the gun liner and drive rolls occasionally, and keep the gun nozzle clean of spatter. Replace the contact tip if blocked or feeding poorly.

10. Keep the gun straight as possible when welding, to avoid poor wire feeding.

11. Use both hands to steady the gun when you weld. Do this whenever possible. (This also applies to Stick and TIG welding, and plasma cutting.)

Diagram 6: Welding Wire

Solid Carbon-Steel ER70S-6	• Must be used with $C0_2$ or 75% Argon/25% (C-25) shielding gas • CO_2 gas is economical and deeper penetration • 75% Argon/25%$C0_2$ has less spatter and better bead appearance • Indoor use with no wind • For auto body, manufacturing fabrication • Welds thinner materials (22 gauge) than flux cored wires
Flux Cored/ Carbon-Steel E71TGX	• No shielding gas required • Excellent for outdoor windy conditions • For dirty, rusty, painted materials • Hotter than solid wires, welds to 18 gauge materials and thicker
Aluminum ER5356	• Must be used with Argon shielding gas • Recommended to be used with spool guns for best results • 5356 harder for stronger welds and easier feeding
Stainless Steel ER308L	• Must be used with Trimix (Helium/ Argon/C02) or spray shielding gas • For 301, 302, 304, 305, and 308 stainless base metals

12. Keep wire feeder hub tension and drive roll pressure just tight enough to feed wire, but don't overtighten.

13. Keep wire in a clean, dry place when not welding, to avoid picking up contaminants that lead to poor welds.

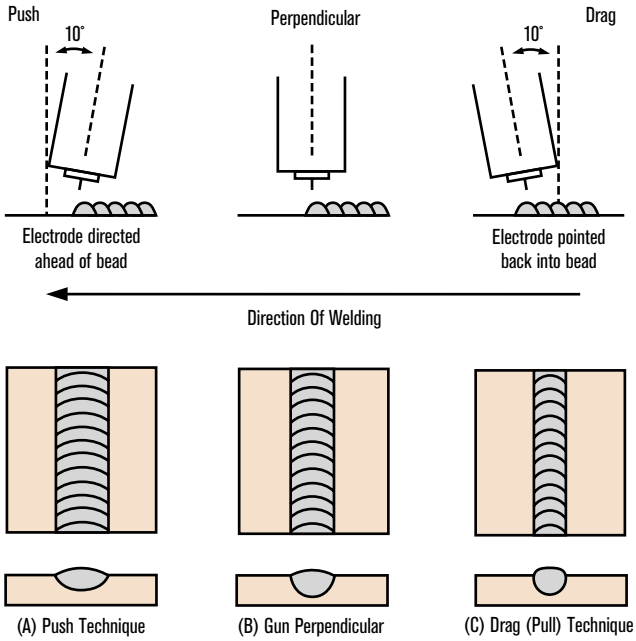
14. Use DCEP (reverse polarity) on the power source.

15. A drag or pull gun technique will give you a bit more penetration and a narrower bead. A push gun technique will give you a bit less penetration, and a wider bead. **(Refer to Diagram 3. Effect of Electrode Position and Welding Technique)**

16. When welding a fillet, the leg of the weld should be equal to the thickness of the parts welded. **(Refer to Diagram 10. Recommended Fillet Weld Thickness)**

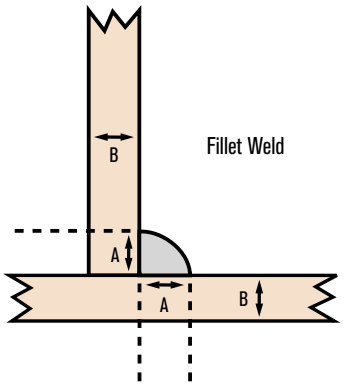
17. Compare your weld to our photos to determine proper adjustments. **(Refer to Diagram 7. Example of Good and Bad MIG Welds**

Diagram 3



Effect of Electrode Position and Welding Technique

Diagram 10: Recommended Fillet Weld Thickness



The leg (A) of the weld should be equal to the thickness of the parts welded (B).

Diagram 5: Example of Good and Bad MIG Welds